

[LIQUID-FILLED BALLOONS FOR IMMERSION LITHOGRAPHY]

Abstract

A liquid-filled balloon may be positioned between a workpiece, such as a semiconductor structure covered with a photoresist, and a lithography light source. The balloon includes a thin membrane that exhibits good optical and physical properties. Liquid contained in the balloon also exhibits good optical properties, including a refractive index higher than that of air. Light from the lithography light source passes through a mask, through a top layer of the balloon membrane, through the contained liquid, through a bottom layer of the balloon membrane, and onto the workpiece where it alters portions of the photoresist. As the liquid has a low absorption and a higher refractive index than air, the liquid-filled balloon system enhances resolution. Thus, the balloon provides optical benefits of liquid immersion without the complications of maintaining a liquid between (and in contact with) a lithographic light source mechanism and workpiece.